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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,181	11/13/2003	Jiebo Luo	87279DMW	7890
7590	07/13/2007		EXAMINER	
Pamela R. Crocker Patent Legal Staff Eastman Kodak Company 343 State Street Rochester, NY 14650-2201			KRASNIC, BERNARD	
			ART UNIT	PAPER NUMBER
			2624	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/712,181	LUO ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Bernard Krasnic	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 16 May 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-6,8,10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-6, 8, and 10-11 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Response to Arguments***

1. The amendment filed 5/16/2007 have been entered and made of record.

2. The Applicant canceled claims 7 and 9.

3. In response to the amendments filed on 5/16/2007:

The "Objections to the specification" have been entered and therefore the Examiner withdraws the objections to the specification.

The "Objections to the claims" have been entered and therefore the Examiner withdraws the objections to the claims.

The "Claim rejections under 35 U.S.C. 112, second paragraph" have been entered and therefore the Examiner withdraws the rejections under 35 U.S.C. 112, second paragraph.

4. Applicant's arguments with respect to claims 1-6, 8, and 10-11 have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's arguments filed 5/16/2007 have been fully considered but they are not persuasive.

The Applicant alleges, "In contrast to claim 1 ..." in page 7 and "In addition, the Simpson reference is not understood ..." in page 7, and states respectively that the Simpson art reference teaches away from classifying images as claimed in claim 1 and

teaches classifying pixels instead. However the Examiner disagrees because Simpson clearly states that the classification is for the "individual images" and for the "sequences of images" [see abstract, lines 8-10, page 2138, section 1) Single Image Classification, page 2139, section 2) Image Sequence Classification]. Although Simpson discusses pixel classification, this pixel classification is intended to support the overall method of creating an overall classification of the entire image itself.

The Applicant alleges, "In addition, the Simpson reference is not understood ..." in page 7, and states respectively that Simpson classifies pixels instead of images and that Simpson doesn't teach or suggest performing an initial image classification for each image in a sequence and that Simpson doesn't teach or suggest performing a revised image classification for each image in the sequence as required by claim 1. However the Examiner disagrees initially because Simpson does disclose clearly that the classification is for images as discussed above. The Examiner also disagrees secondly because Simpson does teach classification for each image in the sequence and creating a revised image classification for each image in the sequence. Simpson discloses providing a sequence of about twelve daylight scene images per day and generating an independent classification [Feed Forward Neural Network (FFNN) or in other words the single FFNN or in other words the three layer Feed Forward Neural Network (NNCCS): no feedback, see page 2139, Fig. 3a, abstract, lines 8-10] for each of the individual single images provided from this twelve daylight scene images sequence. Simpson also discloses providing this twelve daylight scene images per day sequence and generating a "time series" dependent sequence classification [Recurrent

Art Unit: 2624

Neural Network (RNNCCS): feedback, see page 2139, Fig. 3b, section 2, paragraph 1, "time series" shows that the temporal succession of the sequence is considered when inputting data into the Recurrent Neural Network, abstract, lines 8-10]. Simpson also clearly states that the Recurrent Neural Network (RNNCCS) is "more accurate than a single FFNN" [see page 2139, section 2, paragraph 2 "THE RNNCCS network ...", lines 6-8] which shows a comparison of the classification of the twelve daylight scene images sequence between the two networks is considered and that these networks indeed do classify each image in this twelve scene per day sequence. Therefore, the Single FFNN is used as an initial classification for each of this twelve daylight scene images individually [no feedback] and the Recurrent Neural Network is used as a more accurate or a revised type of classification of each of the twelve daylight scene images sequence [with this time series dependent input using feedback]. Therefore the rejections using the Simpson art reference will be maintained.

In response to the amended limitation "at least two pairs of consecutive images in the sequence of images having different elapsed times between their capture" of claim 1, the Examiner believes that Simpson suggests this limitation when stating that the "temporal sampling (hourly or faster) provides about twelve daylight scenes per day". This statement of sampling hourly or faster gives reason that the sampling could be done evenly (time elapsed hourly) or unevenly (time elapsed differently, hourly or faster meaning an elapsed hour between one consecutive pair and an elapsed half-hour for the next consecutive pair etc.). But to clear any uncertainty which may arise, the Examiner has incorporated a second reference Loui et al (US 6,606,411 B1) to

specifically disclose that the time difference between consecutive or adjacent images are unevenly spaced (different elapsed times between consecutive image pairs).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 1-2 and 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson ("A recurrent neural network classifier for improved retrievals of areal extent of snow cover" - IEEE - vol 39, Oct 2001, pages 2135-2147, applied in prior Office Action) in view of Loui et al (US 6,606,411 B1).

Re Claim 1: Simpson discloses a method / single image classification using feed-forward neural networks (FFNN) and image sequence classification using recurrent neural networks (RNNCCS) (see pages 2138-2139, section B. Present Approaches, abstract, lines 8-10) for improving scene classification of a sequence of digital images / sequence of twelve daylight scenes per day (see page 2139, section 2, paragraph 1) comprising the steps of (a) providing a sequence of images / sequence of twelve daylight scenes per day captured in temporal succession / temporal sampling into time series (see page 2139, section 2 - Image Sequence Classification Using Recurrent

Neural Networks, first paragraph); (b) classifying each of the images individually / Single Image Classification using Feed-Forward Neural Networks (FFNN) based on information / spectral and textural contained in the individual image / single image using no feedback to generate an initial image classification / single image classification for each of the images / sequence of twelve daylight scenes per day (Feed Forward Neural Network (FFNN) or in other words the single FFNN or in other words the three layer Feed Forward Neural Network (NNCCS): each image is individually classified [no feedback], see page 2139, Fig. 3a, abstract, lines 8-10); and (c) imposing a pre-determined temporal context model / Recurrent Neural Network (RNNCCS) on the sequence of images / sequence of twelve daylight scenes per day temporal sampling into time series images to generate a revised image classification / more accurate than a single FFNN for each image / sequence of twelve daylight scenes per day, wherein the pre-determined temporal context model considers the temporal succession / time series of the sequence of image / sequence of twelve daylight scenes per day (Recurrent Neural Network (RNNCCS): time series dependent sequence classification [feedback], see page 2139, Fig. 3b, section 2, paragraph 1, "time series" shows that the temporal succession of the sequence is considered when inputting data into the Recurrent Neural Network, abstract, lines 8-10, page 2139, section 2, paragraph 2 "THE RNNCCS network ...", lines 6-8, "more accurate than a single FFNN" shows a more accurate or revised classification occurs and also that a comparison of the classification of the twelve daylight scene images sequence between the two networks [Single FFNN

Art Unit: 2624

and Recurrent Neural Network] is considered and that these networks indeed do classify each image in this twelve scene per day sequence).

However, Simpson fails to specifically suggest that at least two pairs of consecutive images in the sequence of images having different elapsed times between their capture.

Loui discloses at least two pairs of consecutive images / adjacent pictures in the sequence of images having different elapsed times / uneven time interval or time difference between their capture (see Figs. 2 and 4, col. 3, lines 38-41; col. 4, lines 27-29, the time interval or the time difference between adjacent pictures are uneven as seen in the Figures where some adjacent pictures have 1 minute in elapsed time between them while other adjacent pictures have 2, 4, 6, etc. minutes in elapsed time between them).

Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to modify Simpson's method using Loui's teachings by including the ability to have consecutive images with different elapsed times in order better relate adjacent pictures with clustering (see Loui, col. 3, lines 36-41).

Re Claim 2: Simpson further discloses the information used in step (b) includes pixel information / spectral and textural (see page 2138, section 1 - Single Image Classification Using Feed-Forward Neural Networks, first paragraph).

Re Claim 4: Loui further discloses the pre-determined temporal context model in step (c) is independent of elapsed time between consecutive images (see Figs. 2 and 4, col. 3, lines 38-41, col. 4, lines 27-29, col. 1, lines 59-60; there could be an instance when no time interval data is available).

Re Claim 5: Simpson further discloses the pre-determined temporal context model in step (c) is dependent on elapsed time / temporal sampling into time series between consecutive images (see page 2139, section 2 - Image Sequence Classification Using Recurrent Neural Networks, first paragraph, the Recurrent Neural Network uses the twelve daylight scenes per day evenly hourly spaced sequence of images in a time series manner for further improvement in classification).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson as modified by Loui, and in further view of Tretter et al (US 6,977,679 B2, applied in prior Office Action). The teachings of Simpson as modified by Loui have been discussed above.

However, Simpson as modified by Loui fails to specifically suggest the information used in step (b) includes capture-device generated metadata information.

Tretter, as recited in claim 3, discloses the information used in step (b) includes capture device generated / digital camera metadata / focusing distance information (see abstract, lines 6-13).

Art Unit: 2624

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Simpson's method, as modified by Loui, using Tretter's teachings by including focusing distance metadata to Simpson's step (b) in order to enhance the classification of snow cover by further distinguishing clouds and snow cover by identifying the difference in distance between clouds and the snow cover from the satellite which captures images.

10. Claims 6, 8, and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simpson as modified by Loui, and further in view of Huang ("Integration of multimodal features for video scene classification based on HMM" - IEEE - Sept 1999, pages 53-58, applied in prior Office Action). The teachings of Simpson as modified by Loui have been discussed above.

However, Simpson as modified by Loui fails to teach that the temporal context model is a causal Hidden Markov Model, that the temporal context model is a non-causal model, that the temporal context model is imposed using a Viterbi algorithm, and that the temporal context model is imposed using a belief propagation algorithm.

Huang, as recited in claim 8, discloses the pre-determined temporal context model is a non-causal model / discrete ergodic Hidden Markov Model dependent on both the previous image and a subsequent image / visited from any state (see page 55, section Product HMM, page 56, section SIMULATION RESULTS, second paragraph, the discrete ergodic HMM visits any states or images from any state or image which makes the model non-causal).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Simpson's method, as modified by Loui, using Huang's teachings by replacing a non-causal discrete ergodic Hidden Markov Model with Simpson's temporal context model in order to give more correlation data between all the images of the sequence instead of just a few images (images before the current image) to further improve the accuracy of the classification.

Although Simpson's temporal context model, as modified by Loui, and in further view of Huang's modifications teaches a non-causal discrete ergodic Hidden Markov Model, it does not specifically disclose, as recited in claim 6, that the temporal context model is the causal Hidden Markov Model dependent on a previous image, and it does not specifically disclose, as recited in claim 10, that the temporal context model is imposed using Viterbi algorithm, and it does not specifically disclose, as recited in claim 11, that the temporal context model is imposed using a belief propagation algorithm. It would have been obvious to one of ordinary skill in the art at the time the invention was made though to have such a feature of causality in a HMM model, a Viterbi algorithm, or a belief propagation algorithm for a temporal context model because they are just other methods of computing the probability for classification of a particular sequence which Huang's non-causal Hidden Markov Model is basically accomplishing.

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sun discloses MyPhotos which is a system for home photo management and processing.
  
12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).  
  
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.
  
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

Art Unit: 2624

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bernard Krasnic  
July 6, 2007

JINGGE WU  
SUPERVISORY PATENT EXAMINER